HOMESTAKE
Grants Reclamation Project

Homestake Mining Company of California

Thomas Wohlford
Closure Manager

October 18, 2018

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Ron C. Linton, Project Manager
Uranium Recovery and Material Decommissioning Branch
U.S. Nuclear Regulatory Commission
Mail Stop: T-5A10
Washington, D.C. 20555-0001

Re: Reply to "Request for Additional Information – NRC Review of Groundwater Monitoring Plan, Docket No. 040-08903, License No. SUA-1471

Dear Mr. Linton:

Homestake Mining Company of California (HMC) has prepared this response to a Request for Additional Information (RAI) (ML18214A218) by the Nuclear Regulatory Commission (NRC) (letter dated September 28, 2018) concerning "the Groundwater Monitoring Plan for the Grants Reclamation Project, (ML18018A102)" submitted to the U.S. Nuclear Regulatory Commission (NRC) on November 20, 2017. NRC indicates that additional information is required from HMC regarding the groundwater monitoring plan.

Should you have any questions or comments regarding the attached RAI responses, please contact me at twohlford@homestakeminingcoca.com or (505) 290-2187.

Sincerely,

Thomas P. Wohlford
Closure Manager
Homestake Mining Company, Grants, New Mexico

cc: A. Winton, NMED, Santa Fe, New Mexico (electronic and hard copy)
M. Purcell, EPA, Dallas, Texas (electronic copy)
M. McCarthy, Barrick, Toronto, Ontario (electronic copy)
C. Burton, Barrick, Henderson, Nevada (electronic copy)
R. Whicker, ERG, Albuquerque, New Mexico (electronic copy)
G. Hoffman, Hydro-Engineering, Casper, Wyoming (electronic copy)

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Preface

The following presents HMC responses to RAIs from NRC concerning "the HMC's proposed Groundwater Monitoring Plan. Each RAI from NRC is shown in italics, followed by HMC's response.

RAI #1

Please submit NRC Form 313 for the Groundwater Monitoring Plan License Amendment Request as part of the HMC response to these RAIs.

HMC Response

Attachment 1 contains the NRC Form 313 for this amendment.

RAI #2

Please provide the requested changes to License Condition 35A that would be implemented with this license amendment request.

HMC Response

The SP2 sample location listed in the monitoring table included as Table 2-1 of the Groundwater Monitoring Plan for the Grants Reclamation Project should be removed because, as noted in RAI #5, it is already specified as a sample location in License Condition 35C. Other changes to the Groundwater Monitoring Plan for the Grants Reclamation Project include noting that the reference to well DE9 in Section 2.2 of the submittal was a typographical error and the correct well name is CE9. Additionally, wells 490 and CE2 were mistakenly left off of Table 2-1 while their locations are shown on the maps, and therefore they are to be added to the monitoring program. The following is the proposed License Condition 35A text:

A. Implement the groundwater monitoring shown in Tables 2-1 and 2-2 of the Groundwater Compliance Monitoring Plan Revisions submitted November 20, 2017, except delete the SP2 monitoring. Well 490 is to be added to the list of South Off-Site Wells and well CE2 is to be added to the Upper Chinle Wells list.

RAI #3

Please include restoration of the Middle Chinle aquifer north of the LTP in the groundwater monitoring program or provide additional justification demonstrating that the observed concentrations are natural.

HMC Response

Restoration in the Middle Chinle aquifer west of the West Fault is needed in its subcrop area where the alluvial aquifer exists and extending to the north to just north of County Road 63 which is on the north side of the Large Tailings Pile (LTP). Figure 1 shows the locations of the Middle Chinle wells north of the road and also shows that the natural direction of groundwater flow (red arrow) in the Middle Chinle is to the southwest west of the West Fault prior to being affected by the HMC injection. The blue arrows show that, after HMC's injection program had an impact, the direction of groundwater flow remained to the southwest between wells CW35 and CW24, but there was a general reversal of the groundwater flow direction south of this area. Figure 2 presents a time plot of the water level elevations for Middle Chinle wells CW17, CW24, CW35 and CW61, and shows that the water level elevation in

well CW17 gradually rose due to the injection until the level was similar to or higher than the water level elevation in well CW24. Water level elevations in wells CW17 and CW61 are significantly lower than those in wells CW24 and CW35 after the start of the CW62 collection. The water level elevations in the Middle Chinle wells for 2015 are posted on Figure 3 which shows the lowest water level elevation of 6542.48 at well CW17 with flow from the north and south moving toward this area in the Middle Chinle aquifer. Because the general groundwater flow direction north of well CW24 area remains to the southwest, and the groundwater quality in this area of the Middle Chinle aquifer is not impacted by HMC activities, restoration is not needed in wells north of the first line of wells just north of the county road.

Three water quality figures are used to show where the reversal of the groundwater flow in the Middle Chinle aquifer has affected the natural Middle Chinle water quality west of the West Fault. Chloride concentrations are naturally below 100 mg/l in the Middle Chinle aquifer west of the West Fault and Figure 4 shows that the water quality from the subcrop up to the first line of wells just north of the county road has been affected by the alluvial injection in the subcrop area as indicated by an increase in chloride concentration to over 100 mg/l. In contrast, chloride concentrations in wells farther to the north are consistent with natural concentrations.

The 2018 uranium concentration map (see Figure 5) for the Middle Chinle aquifer west of the West Fault shows where restoration is needed in this aquifer. Uranium concentrations north of the first row of Middle Chinle wells just north of the county road are natural and do not need restoration even though concentrations in well CW35 sometimes slightly exceed the Chinle mixing zone standard. A pattern indicating exceedance of the uranium site standard is shown just north of well CW35 in 2018 due to these natural uranium concentrations slightly exceeding the Chinle mixing zone standard of 0.18 mg/l. The occurrence of slight exceedances of the site standard in a small percentage of samples from wells with naturally-occurring uranium concentrations is expected because the site standard was derived using the 95 % confidence level for uranium concentration data from the background wells.

Figure 6 presents a concentration versus time plot for chloride and uranium in Middle Chinle wells CW17, CW24 and CW35. The data shown with a blue dot or circle symbol shows that uranium and chloride concentrations for well CW17 were small or representative of natural conditions prior to 2006, but that chloride concentrations increased in 2006 due to the reversal of groundwater flow back to this well. Chloride and uranium concentrations farther north at wells CW24 (red data) and CW35 (green data) have stayed low and fairly stable over the record of monitoring. These data show that concentrations in wells CW24 and CW35 are natural and that slight exceedances of the statistically derived site standards may occasionally occur in well CW35.

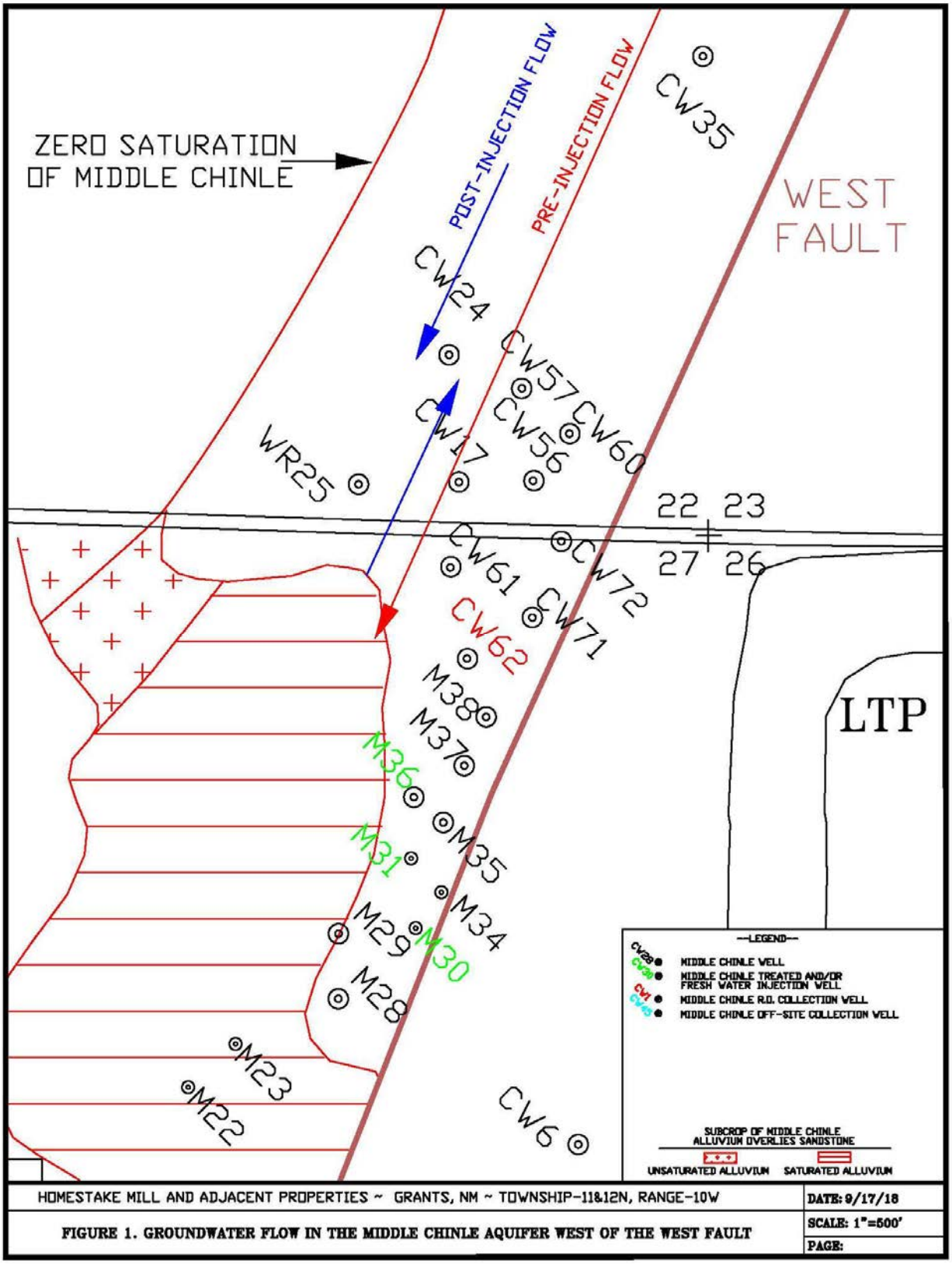


FIGURE 1. GROUNDWATER FLOW IN THE MIDDLE CHINLE AQUIFER WEST OF THE WEST FAULT

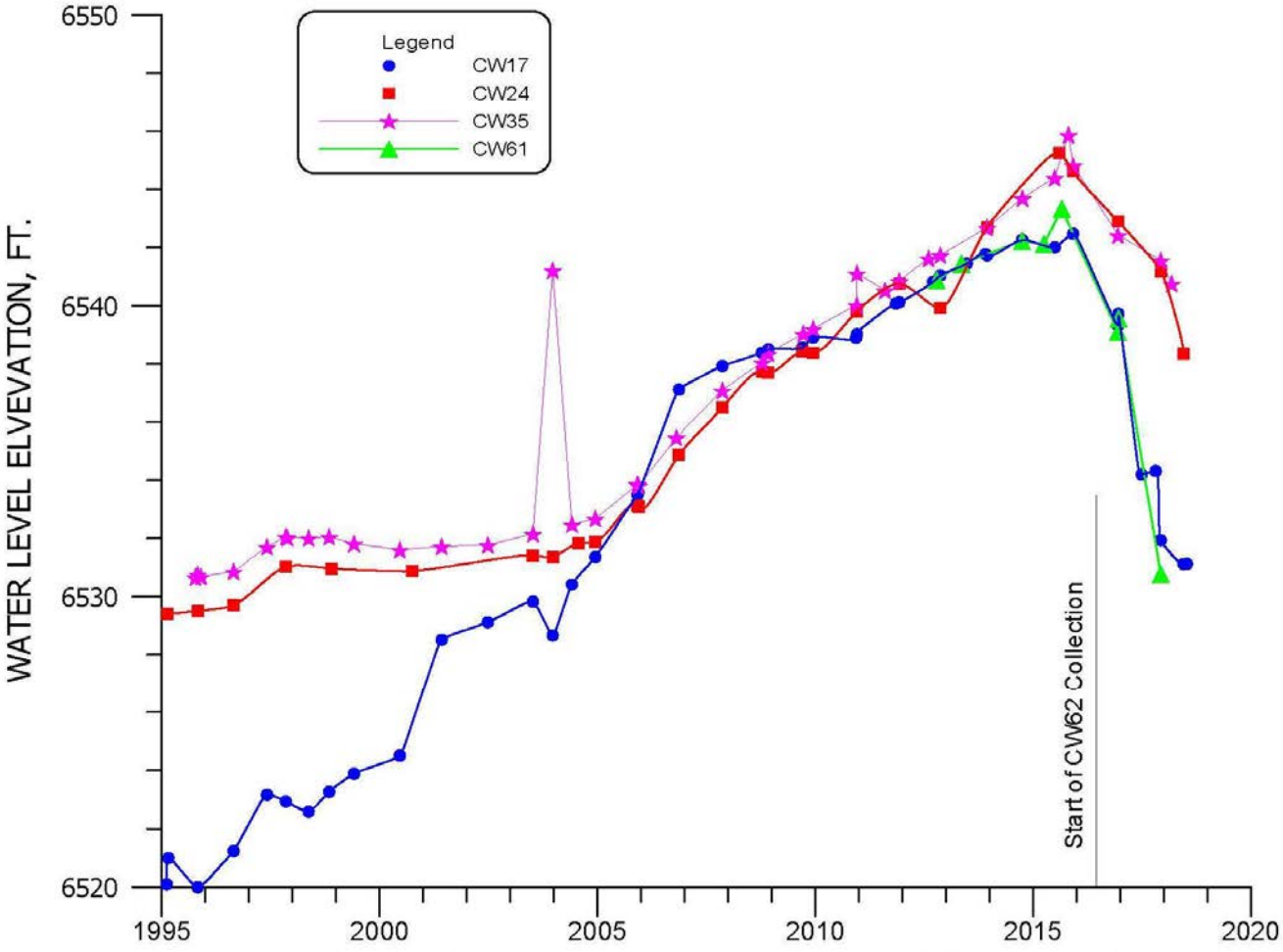
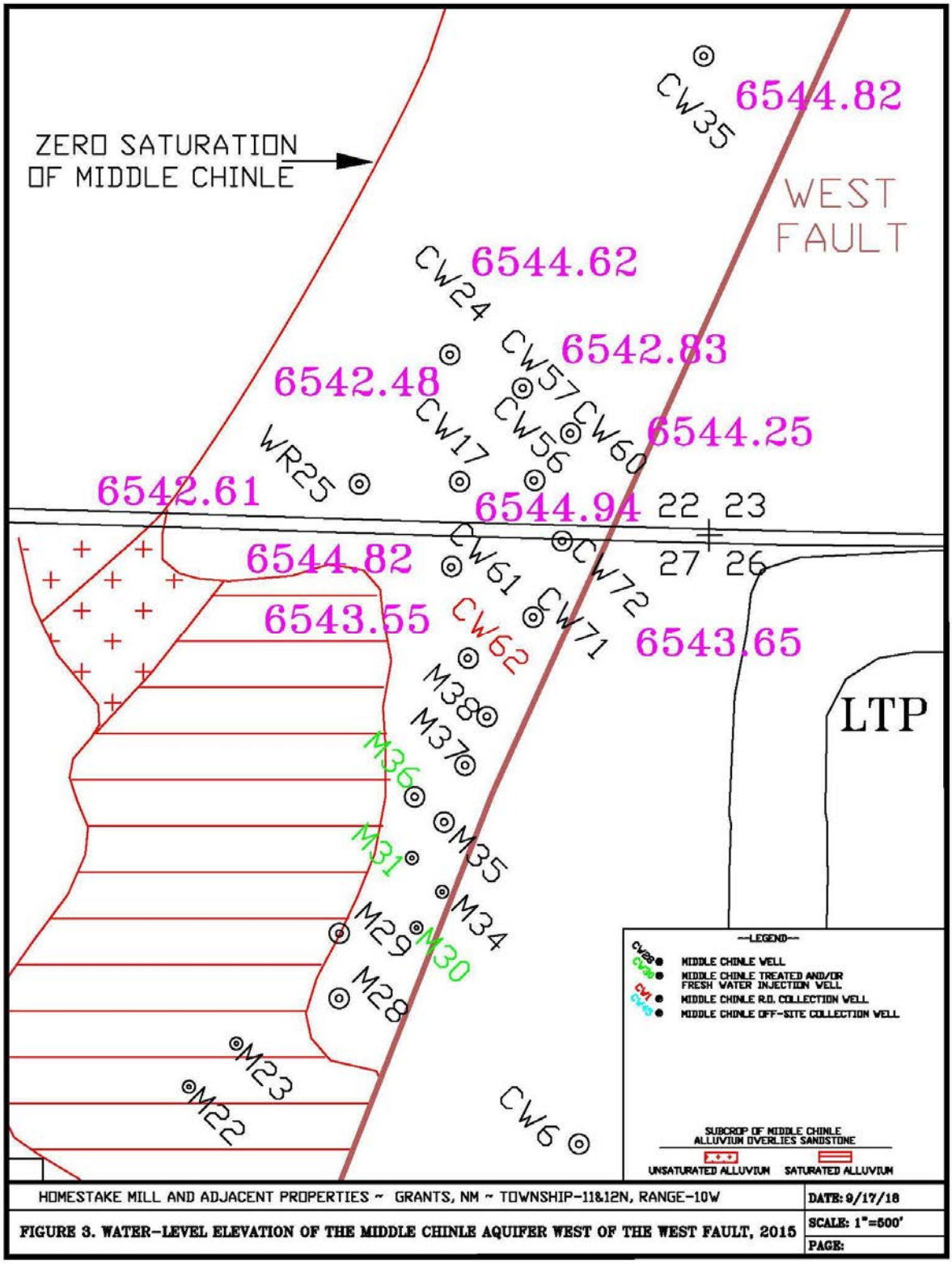


FIGURE 2. WATER LEVEL ELEVATIONS FOR WELLS CW17, CW24, CW35 AND CW61.


ZERO SATURATION
OF MIDDLE CHINLE
WEST
FAULT
CW35
6544.82
CW24
6544.62
CW57
6542.83
6542.48
CW17
CW56
CW60
6544.25
WR25
6542.61
6544.94
22
23
27
26
CW61
CW72
6544.82
6543.55
CW62
CW71
6543.65
M38
M37
LTP
M36
M35
M31
M34
M29
M30
M28
M23
M22
CW6
—LEGEND—
MIDDLE CHINLE WELL
MIDDLE CHINLE TREATED AND/OR FRESH WATER INJECTION WELL
MIDDLE CHINLE R.O. COLLECTION WELL
MIDDLE CHINLE OFF-SITE COLLECTION WELL
SUBCROP OF MIDDLE CHINLE ALLUVIUM OVERLIES SANDSTONE
UNSATURATED ALLUVIUM
SATURATED ALLUVIUM
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W
DATE: 9/17/18
FIGURE 3. WATER-LEVEL ELEVATION OF THE MIDDLE CHINLE AQUIFER WEST OF THE WEST FAULT, 2015
SCALE: 1"=500'
PAGE:

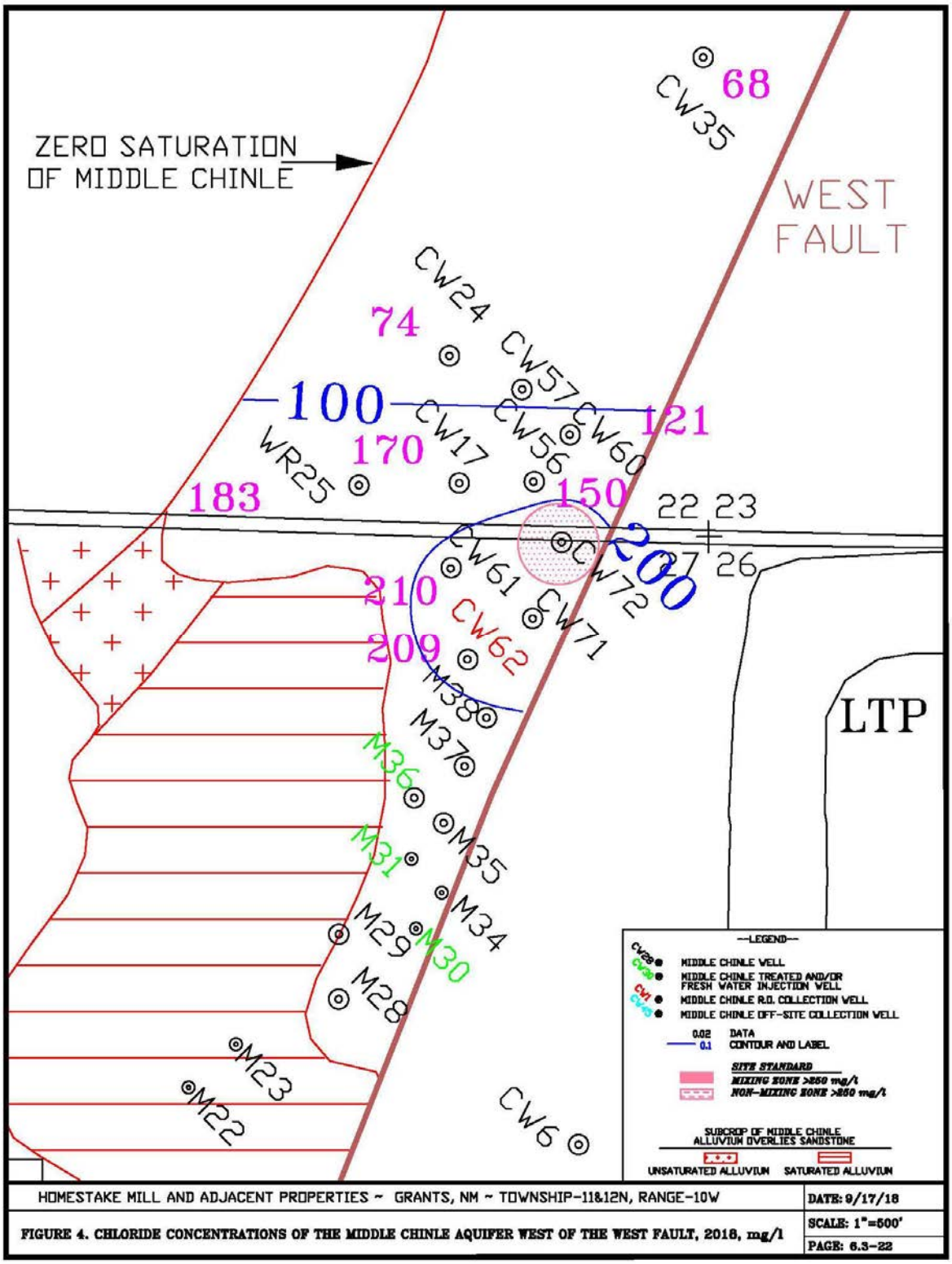


FIGURE 4. CHLORIDE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER WEST OF THE WEST FAULT, 2018, mg/l

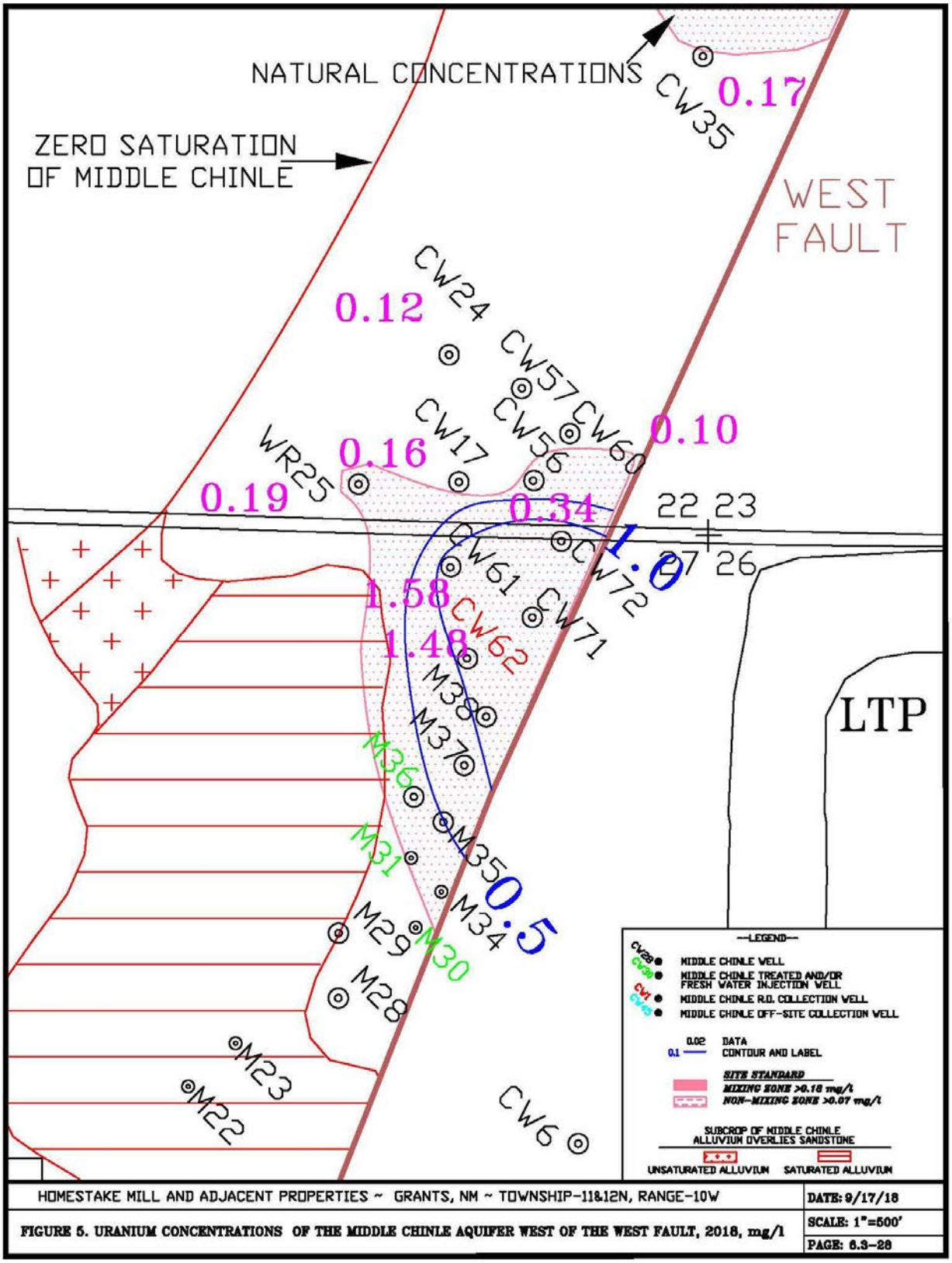


FIGURE 5. URANIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER WEST OF THE WEST FAULT, 2018, mg/l

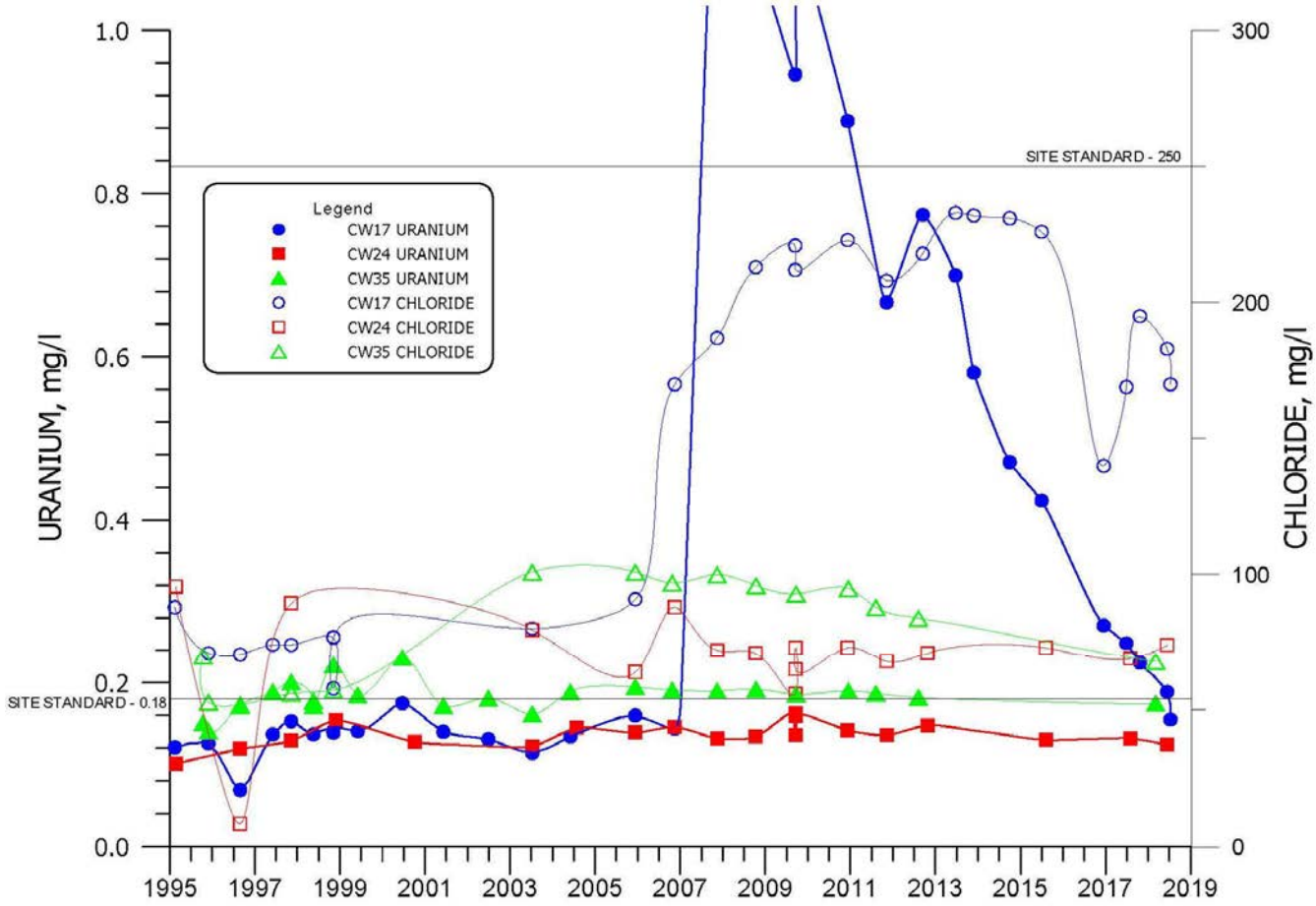


FIGURE 6. URANIUM AND CHLORIDE CONCENTRATIONS FOR MIDDLE CHINLE WELLS CW17, CW24 AND CW35.

RAI #4

Propose and justify a monitoring period after the cessation of corrective actions to verify that contaminant concentrations do not rebound after groundwater restoration activities have been completed. As part of that response, please provide a discussion of HMC's strategy to consolidate the groundwater monitoring program as restoration of the groundwater is completed.

HMC Response

HMC plans to monitor the compliance wells in an area where the restoration is deemed to be completed at a quarterly frequency for two years after cessation of corrective action to verify stability of the water quality. The samples will be analyzed for all site standard constituents. An evaluation of the stability of the groundwater quality in the restored area will be conducted. This evaluation of the groundwater quality stability will include a determination if these compliance monitoring wells can be removed from the groundwater monitoring program. Presently, the seven wells in the Western Portion of the North Off-Site Wells are being sampled at a quarterly frequency for two years for all alluvial groundwater site standard constituents. An evaluation is expected to be conducted and submitted in 2020 to determine if these wells should be removed from the compliance monitoring program.

RAI #5

Sampling Point 2 (SP2) is listed in Table 2-1 of the amendment request, as a groundwater monitoring location. The NRC staff notes that monitoring of SP-2 is already required in License Condition 35C, and listing it as a groundwater monitoring location may be redundant.

HMC Response

The response to RAI #2 notes that sampling location SP2 should not be included with the groundwater monitoring.

RAI #6

Clarify whether well DE9 in the last sentence of Section 2.2 of the amendment request should be well CE9.

HMC Response

The description of a well DE9 in Section 2.2 of the amendment request was a typographical error and the correct well name is CE9 as listed in Table 2-1.

ATTACHMENT 1 – NRC Form 313 for the Groundwater Monitoring Plan License Amendment

NRC FORM 313 (10-2017) 10 CFR 30, 32, 33, 34, 35, 36, 37, 39, and 40 — **U.S. NUCLEAR REGULATORY COMMISSION**

APPLICATION FOR MATERIALS LICENSE

APPROVED BY OMB: NO. 3150-0120 — **EXPIRES: 06/30/2019**

Estimated burden per response to comply with this mandatory collection request: 4.3 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

INSTRUCTIONS: SEE THE CURRENT VOLUMES OF THE NUREG-1556 TECHNICAL REPORT SERIES ("CONSOLIDATED GUIDANCE ABOUT MATERIALS LICENSES") FOR DETAILED INSTRUCTIONS FOR COMPLETING THIS FORM: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1556/. SEND TWO COPIES OF THE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

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DIVISION OF MATERIAL SAFETY, STATE, TRIBAL AND RULEMAKING PROGRAMS
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

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ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA,

SEND APPLICATIONS TO:

LICENSING ASSISTANCE TEAM
DIVISION OF NUCLEAR MATERIALS SAFETY
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PA 19406-2713

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MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

IF YOU ARE LOCATED IN:

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SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
1600 E. LAMAR BOULEVARD
ARLINGTON, TX 76011-4511

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*

- ☐ A. NEW LICENSE
- ☑ B. AMENDMENT TO LICENSE NUMBER — SUA-1471
- ☐ C. RENEWAL OF LICENSE NUMBER

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include zip code)*

Homestake Mining Company of California
P.O. Box 98
Grants, New Mexico 87020

3. ADDRESS WHERE LICENSED MATERIALS WILL BE USED OR POSSESSED

Homestake Mining Company of California
560 Anaconda Road
Milan, New Mexico 87021

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Tom Wohlford

BUSINESS TELEPHONE NUMBER	BUSINESS CELLULAR TELEPHONE NUMBER
(505) 287-4456	(505)-290-2187

BUSINESS E-MAIL ADDRESS
twohlford@barrick.com

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time.	6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.
	7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE.
8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.	9. FACILITIES AND EQUIPMENT.
10. RADIATION SAFETY PROGRAM.	11. WASTE MANAGEMENT.

12. LICENSE FEES (Fees required only for new applications, with few exceptions*) *(See 10 CFR 170 and Section 170.31)*
***Amendments/Renewals that increase the scope of the existing license to a new or higher fee category will require a fee.**
FEE CATEGORY: ____ AMOUNT ENCLOSED: $ ____

PER THE DEBT COLLECTION IMPROVEMENT ACT OF 1996 (PUBLIC LAW 104-134), YOU ARE REQUIRED TO PROVIDE YOUR TAXPAYER IDENTIFICATION NUMBER. PROVIDE THIS INFORMATION BY COMPLETING NRC FORM 531: https://www.nrc.gov/reading-rm/doc-collections/forms/nrc531info.html.

13. CERTIFICATION. *(Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.*

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 37, 39, AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.
WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE	SIGNATURE	DATE

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
			$		
APPROVED BY				DATE	